# Czech Hydrometeorological Institute

# ALADIN@CHMI

## Model set-up

- LACE domain (309x277 grid points, linear truncation E159x143, Δx=9km)
- 43 vertical levels, mean orography
- time step 360 s
- OI surface analysis based on SYNOP
- digital filter spectral blending of the upper air fields, long cut-off cycle (6h cycle, filtering at truncation E61x55, no DFI in the next +6h guess integration)
- digital filter blending + incremental DFI initialization of short cut-off production analysis of the upper air fields
- 3h coupling interval
- ALADIN cycle 35t1_plus (ALARO-0 with 3MT)
- OpenMP parallel execution
- 00, 06, 12 and 18 UTC forecast to +54h
- hourly off-line fullpos
- post-processing using obs-operators of OI

- hourly DIAGPACK analysis (SYNOPs)
- verifpack on CY32T1
- monitoring of SYNOP and TEMP observation based on OI quality control



## ALADIN/Afghanistan
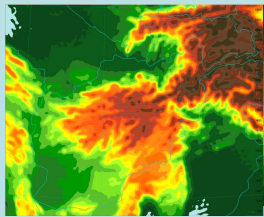


- domain (162x135 grid points, linear truncation E80x67, Δx=10km)
- 43 vertical levels
- time step 360 s
- digital filter spectral blending of the upper air fields + incremental DFI initialization, (6h assimilation cycle, filtering at truncation E18x15)
- 3h coupling interval, ARPEGE driven
- ALADIN cycle 35t1_plus (ALARO-0 with 3MT)
- OpenMP parallel execution
- 00 and 12 UTC forecast up to +48h
- used mainly for weather service at Kabul airport

## Mediterranean Forecasting System Toward Environmental Predictions
### European Commission research grant

- domain (256x200 grid points, linear truncation E127x99, Δx=9.5km)
- 37 vertical levels
- time step 400 s
- digital filter spectral blending of the upper air fields + incremental DFI initialization, (6h assimilation cycle, filtering at truncation E28x22)
- 3h coupling interval
- ALADIN cycle 29t2mxl (preALARO-0)
- OpenMP parallel execution
- 00 forecast up to +120h once a week
- hourly GRIB latlon products used by MFSTEP community
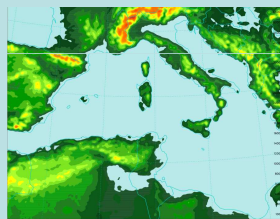


## Operations

**HW system:**
- **NEC SX-6/8A 64GB**
- **Linux cluster (suite control & products)**
**Operational team:**
- **4 NWPers (on-call support)**
- **computer operators**
**The suite operated under SMS 4**
**Download of LBC via RMDCN**
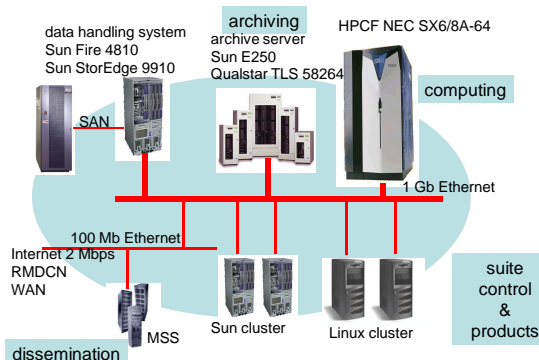


## Major operational changes (April 2008 – Jun 2009)

- **4 Jun 2008** switch from ALARO-0-minus-3MT to a complete ALARO-0 package
- **16 Dec 2008** new diagnostic formulae of T2m
- **17 Feb 2009** new post-processing domain with 1km resolution
- **15 Apr 2009** switch to cycle CY35T1
- **5 May 2009** retuning of the T2m diagnostics
- **8 Jun 2009** new SL interpolator

Former cubic Lagrangian interpolator in SL scheme was superseded with less diffusive SL interpolator with better conservative properties. Reduced inherent diffusivity of the new SL interpolator had to be compensated by increased activity of the SLHD.
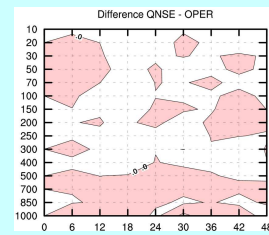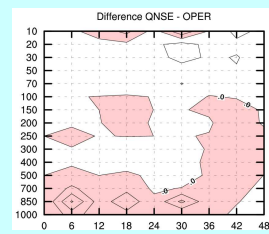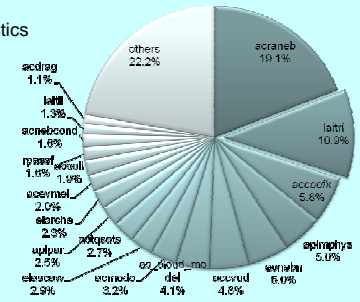


## Developments – eTKE

- TKE scheme based on QNSE theory (Sukoriansky et al., 2005) which has been consistently extended towards the unstable stratification
- Bougeault-Lacarrere mixing length (1989)
- shallow convection following Geleyn (1987)
- anti-fibrillation scheme following ideas of Benard et al. (2000)

- preparation of new shallow convection scheme and inclusion of third order momentum terms in eTKE

Geopotential (upper) and temperature (lower) RMSE compared against present operational suite. Pink areas show improvement of the forecast with eTKE.



## New Post-Processing Domain

### A lat/lon domain with 1km resolution over Czech Republic
Detailed orography helps to obtain refined forecast of screen level fields
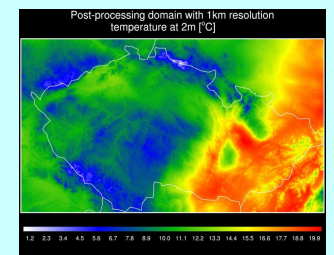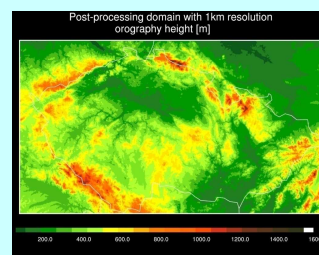


### Assimilation of AMDAR data
Evaluation of the impact of AMDAR data assimilation. Verification was done with respect to radio-soundings and ECMWF analysis (to assess the forecast in altitude having independent source of validation).
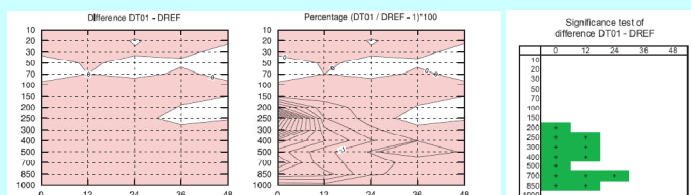


Wind speed RMSE computed against ECMWF analysis: pink areas show weak forecast improvement when including AMDAR data into the assimilation cycle, confirmed also by the statistical significance test.
Verification done with respect to radio-sounding stations (themselves active in data assimilation cycle) gives on the contrary weak deterioration (not shown).